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ABSTRACT

This syllabus outlines a course of study in integrated regional resources management based on the experience of the Tennessee Valley Authority (TVA). The course has been developed for resource practitioners, in developing countries, who have responsibilities related to topics addressed in the course's 14 instructional modules. These topics are: integrated regional resources management approach --the systems approach; building organizational capability; water resource management; agricultural resource development; fertilizer and chemical development; forest management; wildlife management; air resource management; energy resources management; designing and building for the future; regional economic development; community development; and land use and resources management. The final module is an integrated regional resources management practicum in which participants apply concepts from the topic areas to a specific situation and develop a plan of action. Each module (ranging in length from 2 to 5 days) contains a combination of lectures, readings, case histories, field observation, and case study activities combined with group exercises in which participants plan and evaluate integrated resource development programs and projects. Course goals and objectives are outlined in an introduction. (JN)

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INTEGRATED REGIONAL RESOURCES MANAGEMENT

A SYLLABUS FOR AN INTERNATIONAL TRAINING COURSE BASED ON THE EXPERIENCE OF THE TENNESSEE VALLEY AUTHORITY

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June 1984

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CONTENTS

	Page
Introduction	1
Course Structure	3
Course Modules	4
Integrated Regional Resources Management - The Systems Approach	4
Building Organizational Capability	4
Water Resource Management	5
Agricultural Resource Development	6
Fertilizer and Chemical Development	7
Forest Management	9
Wildlife Management	9
Air Resource Management	10
Energy Resources Management	11
Designing and Building for the Future	13
Regional Economic Development	14
Community Development	15
Land Use and Resources Management	16
Integrated Regional Resources Management Practicum	17

INTRODUCTION

This syllabus outlines a course of study on Integrated Regional Resources Management based on the experience of the Tennessee Valley Authority (TVA). The course has been developed for resource practitioners in developing countries with responsibilities in areas, such as water resource management, agriculture, fertilizer and chemical development, forest and wildlife management, engineering design and construction, and regional economic and community development. Participants should have the ability to participate in discussions, exercises, and projects conducted in English.

The course is designed to (1) illustrate the value of integrated resources management; (2) develop awareness, knowledge, and skills necessary to formulate integrated resource development programs and projects; (3) analyze TVA's experience as a regional resources development organization; and (4) provide experience in applying integrated resource management concepts to the participants' own situation.

Participants will (1) develop a knowledge of fundamental resource concepts, practices, tools, and techniques, and their application in integrated resource development programs and projects; (2) learn how to use a systematic process to plan, develop, implement and evaluate integrated resource development programs and projects; (3) trace the mission, role and development of TVA and its impact in the Tennessee Valley region; and (4) participate in practical exercises that apply integrated resource management concepts and skills.

Participants are encouraged to identify personal objectives within the course objectives, share their home country situation, and adapt the course content to the realities they face. The format of the course facilitates this process by providing small work groups, introducing case studies and case exercises, arranging field trips, and requesting involvement of all participants in an ongoing evaluation process.

The course will be presented in the Tennessee Valley region, which provides opportunities to show how research and technologies are used to develop the resources of the region. Instructors will include experienced TVA coordinators, managers, and technical staff from a wide range of resource areas. Participants will also have the opportunity to interact with decisionmakers and resource specialists outside TVA, most of which have worked in partnership with the agency to develop resource programs and projects.

Although designed for a full semester, the course is flexible enough to meet a wide variety of instructional needs. The course material is divided into fourteen instructional modules. Each module was developed by specialists within the particular subject area. The topics of the modules are listed below:

I. Integrated Regional Resources Management - The Systems Approach
II. Building Organizational Capability
III. Water Resource Management
IV. Agricultural Resource Development
V. Fertilizer and Chemical Development
VI. Forest Management
VII. Wildlife Management
VIII. Air Resource Management
IX. Energy Resources Management
X. Designing and Building for the Future
XI. Regional Economic Development
XII. Community Development
XIII. Land Use and Resources Management
XIV. Integrated Regional Resources Management Practicum

Each module contains a combination of lectures, readings, case histories, field observations, and case study activities combined with group exercises in which participants plan and evaluate integrated resource development programs and projects. The final module is a practicum where participants will have an opportunity to apply the concepts from the topic areas to a specific situation and develop an integrated resource management plan.

Modules range in length from two to eight days. Each module can be expanded and offered separately to meet the needs of professionals seeking detailed knowledge and skills in a particular resource area. Even if offered separately, the modules emphasize the need for managing in an integrated context.

A detailed workbook of resources and references will provide each participant information which they can use to initiate integrated resource management techniques in their home country.

In summary, the course examines fundamental resource management concepts and the application of those concepts in managing integrated resource development programs and projects using the TVA experience as a primary case study. It will explain the importance of the integrated regional resource management approach and how the results can exceed the sum of the efforts to manage resources independently.

For more information on the course, please contact:

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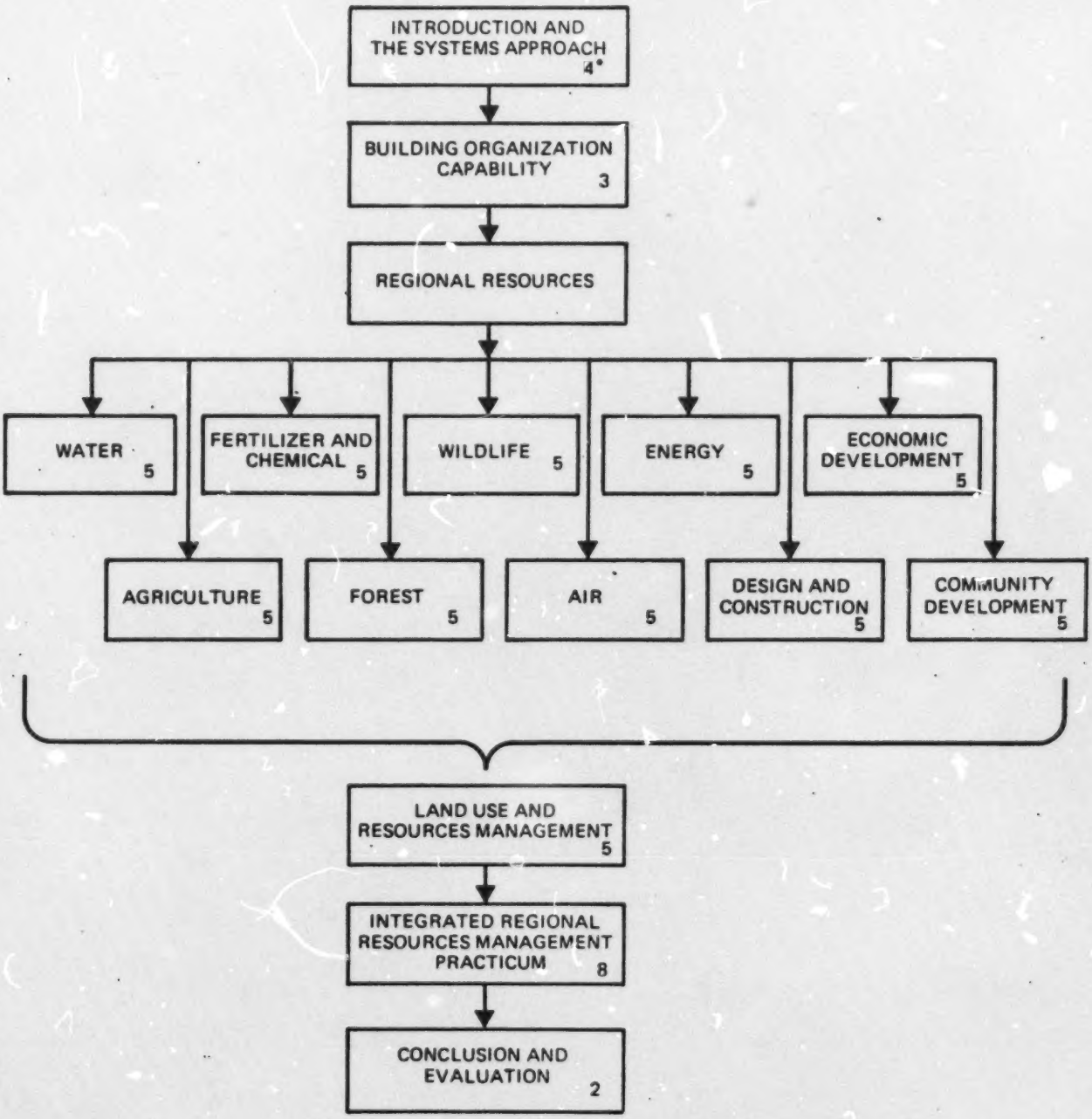
INTEGRATED REGIONAL RESOURCES MANAGEMENT COURSE STRUCTURE



*Indicates number of days topic will cover.

COURSE MODULES

I. INTEGRATED REGIONAL RESOURCES MANAGEMENT - THE SYSTEMS APPROACH

- o Fundamentals of the systems approach: characteristics of systems--components, structural and functional relationships, synergy, productivity, diversity, stability, efficiency, and predictability; the systems attitude.

- o Application of systems approach to regional resource management: defining the region as a system and its resource components, the process of assessing and interpreting resource components and their relationships, management policies and practices designed to fit the system to be managed, conflicts and competing uses, benefits of integrated versus traditional management practices.

- o Systems approach in the Tennessee Valley region: region defined, identifying problems and opportunities, key consideration for integrated regional resource management.

Special Features

- o Historical perspective of the system approach to management of human and natural resources to produce synergistic results.

- o Conveys to participants how the systems approach can be shifted from the theoritical arena and applied in the regional resources management context.

- o Demonstrates how systems theory was at work to produce the regional resource improvements that were realized through the work of the Tennessee Valley Authority.

Instructor/Coordinator

Dr. Clyde W. Voigtlander is an Environmental Scientist in TVA's Division of Environmental Quality. He has worked variously as a research ecologist, senior aquatic ecologist, program manager, and staff ecologist dealing with the ecological aspects of environmental compliance.

II. BUILDING ORGANIZATIONAL CAPABILITY

- o Situational Assessment: assessing available resources including administrative resources; identifying problems and opportunities; political, social, cultural, and economic considerations.

- o Integration techniques among agencies: liaison positions; interagency committees, task force, and councils; integrator position; vertical integration; education and training; managing conflict.

- o Designing and implementing an integrated regional resources management organization: deciding on agency form and authority, internal organization structure, techniques for managing a multipurpose and multidisciplinary organization, recognizing and coping with change, managing conflict.

- o Creation and evolution of TVA as an integrated regional resource development organization: statutory form and powers; TVA Act; internal organization structure; implementation and evolution of structure and function; use of inhouse legal staff to handle litigation; Federal, State, and local involvement.

Special Features

- o Administrative techniques and organizational design for integrated regional resource management.

- o Classroom exercises having students make assessments and apply techniques to situations in their countries.

Instructor/Coordinator

Elizabeth A. E. Brown is an Administrative Analyst in TVA's Division of Personnel. She is TVA's principal staff member for organizational analysis and administrative policy development. She provides internal consulting on organization design and works with all TVA organizations and programs in maintaining the TVA Administrative Release System. She has a law degree and has spent several years as a litigation attorney for TVA.

III. WATER RESOURCES MANAGEMENT

- o Water and civilizations from ancient to present times: attitudes relating to water resources; agricultural, domestic, municipal, and industrial uses; waste disposal; navigation; flood control; electric-power production.

- o Concepts of water resource management: hydrologic cycle, watersheds and catchment basins, relationships between water and land, groundwater systems, stream systems, reliability, quality, and quantity.

- o Disciplines relating to water resource management: meteorology, soil physics, hydrology, agronomy, forestry, geography, economics, social and political science, law, etc.

- o Planning and management practices: resource assessment tools and techniques--streamflow, groundwater needs and demands, water quality, supply and storage, erosion--a special concern, problems and opportunities, conflicts, and competitive uses.

- o Program planning: general considerations--benefits of planning, goals and objectives, public participation and coordination;

evaluation criteria--price relationships, costs, risk, and uncertainty; alternative plans--basic assumptions, review, and decisionmaking.

- o Project execution and evaluation: project size and complexity, operational requirements, evaluation process.

- o Water resource management in the Tennessee Valley: Tennesee River system; topographic and hydrologic features; development of the river system--flood control, navigation, electric power production; Federal, State, and local involvement in water management projects; problems and concerns; emerging issues.

Special Features

- o Fundamentals of multipurpose reservoir planning with field reconnaissance to show examples of the need for and results of integrated resource management.

Instructor/Coordinator

Henry M. Goranflo, Jr., is responsible for hydropower planning in TVA's Division of Air and Water Resources. He has worked with TVA since 1970 in the field of water resources. A large part of that time has been devoted to developing mathematical models that can be used to provide for the optimum operation of the total TVA reservoir system for all purposes.

IV. AGRICULTURAL RESOURCE DEVELOPMENT

- o Fundamentals of agricultural resource development: role in traditional societies; stages of agricultural development; worldwide trends; application of scientific research and technology; role of agriculture in integrated regional development programs; interrelationships between agriculture and other resource management goals and objectives; farm sector, farm-dependent business, and rural infrastructure; social and economic impact on region.

- o Program planning and management practices: assessing and analyzing available resources, identifying problems and opportunities, program planning process, levels of action needed, barriers to development, coordination and local participation developing support services, short-range versus long-range benefits, accommodating change and special situations.

- o Project execution and evaluation: involvement of farm and related nonfarm sectors; information generation, dissemination, interpretation, understanding, and use; coordination; evaluation process.

- o Agricultural development in the Tennessee Valley: general overview; agency policy and practices; program elements--laboratory research,

greenhouse studies, field trials, unit test demonstration farms, and area demonstrations; integrating regional programs--Federal, State, and local involvement; emerging issues and concerns.

Special Features

- o Indepth study of agricultural policies needed to match different stages of agricultural and general development.
- o Practical interface with managers and leaders of demonstration farms, farm-dependent businesses, rural activist groups, farm research centers, and educational institutions.
- o Hands-on laboratory experience in developing plans for farm policy and programs for actual regional problems.

Instructors/Coordinators

Dr. H. A. Henderson is Agricultural Economist for the Division of Development of TVA. He has helped develop a wide range of innovative research, development and rural educational programs in his native Tennessee Valley region, Asia, Africa, South America, and the Caribbean. He was reared on a small farm that became one of the first Demonstration Farms of TVA and he continues to interpret programs for their impact on rural people attempting to overcome their disadvantages.

Robert O. Woodward is a retired Agronomist with Government, farm-dependent business and volunteer experience. A native American Indian with extensive experience in agronomic and general agricultural program development and execution throughout the United States and in selected international projects. His extensive experience in coordinating work of volunteer organizations with agencies and managing international volunteer organizations will be invaluable in topics relating agencies to the public and rural organizations.

Dr. Roger Woodworth, Agricultural Economist, TVA, is involved in research, program planning, and program evaluation. He is skilled in economic evaluation of new technology and in farm management economics.

Dr. W. Joe Free, Agricultural Economist, Tennessee Valley Authority, specializes in innovating new programs involving farm-dependent business in economic development. His interests range from direct marketing by small farms to developing complete national marketing systems for farm products and input supplies.

V. FERTILIZER AND CHEMICAL DEVELOPMENT

- o Fundamentals and basic principles of fertilizer and chemical development: historical perspective, basic concepts, role of fertilizer and farm chemicals in world food production, industry production and worldwide status, consumption patterns, usage as measure of level of economic development, prospects for future.

- Program planning and management practices: assessing available resources; identifying problems and opportunities; production; practices; stages of planning and development; production systems; production requirements--mineral resources, capital outlay, energy requirements, trained staff, etc.; utilization of waste organic materials; marketing and transportation plans; sources of information, technical assistance, investment capital, and loans.

- Project execution and evaluation: plan implementation production, transport, and marketing systems; education and test demonstrations; cooperation with other agencies and institutions; effective integration of fertilizer and chemical projects with other resource areas--potential conflicts; interrelationships and linkages; effects on other resources; evaluation process.

- TVA's contribution: general overview; agency policy and practices; activities and approaches--research and development, test demonstrations, industry demonstration programs, etc.; cost/benefit studies, international involvement; procedures for technology transfer; prospects for future.

Special Features

- Specific information and case studies highlight the development of and extreme importance of world production and use of fertilizers.

- Key factors of heavy investments required for fertilizer production, transport, and marketing systems; energy requirements; and environmental opportunities and restraints are stressed.

- Experience is drawn from TVA's broad influence on fertilizer development in the Tennessee Valley region and the United States, and from continuing assistance in world fertilizer developments by TVA and the International Fertilizer Development Center (IFDC).

- Tours of TVA's National Fertilizer Development Center and neighboring IFDC at Muscle Shoals, Alabama, provide firsthand interface with world developments in crop nutrition.

Instructor/Coordinator

Ronald D. Young is a chemical engineer on the staff of TVA's Division of Chemical Development. He has 42 years of experience, including 37 in broad phases of fertilizer research and development at the National Fertilizer Development Center (NFDC). He is author of numerous publications and has served in short-term assignments related to planning of the fertilizer sector in several developing countries.

Other NFDC employees and recent retirees with similar background and experience might also be involved in presenting the module.

VI. FOREST MANAGEMENT

- Fundamentals of forest management: introductory overview, worldwide trends and institutional responses, review of concepts and practices of success and failures past and present.

- Planning and management practices: basic management principles: implication of research and technology; ownership patterns; alternative view of owners/users, professionals, government, and other institutions; maximizing owner/user inputs in the context of limited government/institutional capabilities; existing dilemmas; deforestation--a special concern; awareness of social and political realities; financial considerations; appropriate management strategies.

- Project execution and evaluation: analysis and discussion of examples, projects developed through government/institutions, projects for small landowners, efficient infrastructure systems.

- The TVA experience in forest management and utilization: historical overview, agency policy and management practices, discussion of selected projects, new initiatives.

Special Features

- Initial understanding of forestry principles as a requirement for decisionmaking.

- Application of proven management tools and techniques.

- Strategies for program planning and implementation.

- TVA case studies of forest management projects.

Instructor/Coordinators

Dr. Donovan C. Forbes is Manager of TVA's Forest Management and Industrial Development Program. He has worked with TVA for 23 years in the field of forest management and has also worked in private industry and academia. He has been a private forest management consultant and has authored numerous publications.

VII. WILDLIFE MANAGEMENT

- Introduction and overview of wildlife management: interrelationships between wildlife and human culture--past, current, and future trends and technology; public and private management; scale of involvement by government, international agencies, and other institutions.

- o Planning and management practices: cultural, social, ecological, and economic considerations; public and private management strategies; responsive approaches to prevailing conditions as well as to particular problems; integrated planning for optimum benefits.

- o The TVA experience in wildlife management: historical overview, land tenure and utilization, public and private cooperation, agency policy and management practices: special projects--Land Between The Lakes as a unique demonstration.

Special Features

- o Discussion of rationale for integrating wildlife management in economic resources development projects.

- o Strategies for managing wildlife within undisturbed and disturbed ecosystems.

- o Strategies for addressing political impediments to sound biological management.

- o Case histories of projects related to managing wildlife as a regional resource.

Instructor/Coordinator

Dr. Ronald J. Field is Program Manager for Wildlife Resources Development with the Tennessee Valley Authority. He has worked as a Wildlife Research Biologist for the U.S. Fish and Wildlife Service, served as Professor and Chairman of the Department of Fisheries and Wildlife at the University of the District of Columbia, and a Professor of Natural Resources and Director of Agricultural Sciences at Tuskegee Institute. He has been a wildlife management consultant and has authored numerous publications in that field.

VIII. AIR RESOURCE MANAGEMENT

- o Fundamentals of air resource management: introductory overview, concepts and issues, interrelationships between air resource and other resource areas and disciplines, worldwide trends and institutional responses.

- o Program planning and management practices: air quality assessment--tools and techniques; research and appropriate technologies--implications for planning and management; management strategies; economic considerations--cost/benefit analysis, funding, and impact on economy; laws and regulations; public and private involvement; special concerns--acid deposition, global carbon dioxide concentration, etc.; alternative management plans and the decisionmaking process.

- Project execution and evaluation: organization structure, skills and resource needs, education and training, application of control methodology, air quality monitoring network, coordination and integration for effective implementation, evaluation criteria and techniques, project flexibility to accommodate change.

- The TVA experience in managing the air resource: historical overview; meteorological and climatological conditions; agency policy and practices; management strategies; public and private participation; social, environmental, and economic considerations and consequences; special projects in the Tennessee Valley; emerging issues and accomodating change.

Special Features

- Use of case studies on the incorporation of air resource management in land use planning and in major individual projects.

- Field trip to view emission control equipment, air quality monitors, and meteorological data collection equipment in operation.

- Exercises to illustrate the approach to air resource management and how it integrates with other resource concerns.

Instructor/Coordinator

Barry L. Barnard is the manager of TVA's Regional Air Quality Management Program and has over 13 years' experience in environmental engineering. He was with a State air quality regulatory agency for approximately 9 years and was involved in the development, implementation, and enforcement of control strategies, management plans, regulations, and legislation. Since coming to TVA in 1979 he has been involved in air resource management planning, program development, and assistance to communities and industry in identifying and managing air quality problems.

IX. ENERGY RESOURCES MANAGEMENT

- Energy and civilizations: man's use and dependency on energy in modern and early civilizations; social, environmental, and economic implications; worldwide trends--energy for a growing population and expanding economy.

- Fundamentals of regional energy resource development: assessing available resources--sources, reliability, stability, technologies, impact on other resource areas, potential markets; identifying problems and opportunities; formulating a regional energy resource development program--establish regional energy goals and policies, match needs and projected demands with reliable energy supply system; dealing with uncertainty; coordination of energy resource planning efforts; advances in planning techniques; management strategies; project identification and development within an integrated context.

- Project execution and evaluation: organization design; technical, administrative, and management resources; financial resources; marketing/public acceptance; economic and political considerations; operation and maintenance; evaluation process.

- The TVA experience in energy resource management and utilization in an integrated context: historical overview--beginnings, major growth period, new directions; assessing and developing the energy resources of the Tennessee Valley region; problems and opportunities; assessing energy and capacity needs; load forecasts--purpose and procedure; systems modeling; capacity requirements, types, and sizes; power plant siting; distribution and transmission system; marketing; operating and maintaining the power system; operator training; preventive maintenance philosophy; short-range load forecasting and operations planning; day-to-day operation; capability and flexibility to accommodate change; shifts in power systems economics; research and new technologies; environmental concerns.

Special Features

- Historical perspective of energy resource development and the global energy context.

- Current planning and management practices in developing energy resources.

- Energy resource program planning as demonstrated by TVA including power system planning and development of distribution and transmission systems.

- Operation and maintenance of TVA's power system.

- Selected case studies of project related to energy resource development.

- Tour of TVA's Power System Control Center, several power generating facilities, and TVA's Solar Training Center.

Instructor/Coordinator

Paul H. Shoun, Chief of the Engineering and Planning Support Staff in TVA's Office of Power and Engineering, will coordinate the classroom presentation and assignment of instructors. Mr. Shoun has had extensive experience in electric utility engineering and operations, has been previously involved in international energy training activities through the Electric Power Research Institute, and has been project director of two international training courses sponsored by the U.S. Institute of International Education which were given by TVA in the past 2 years. Instructors will be assigned from within TVA's Office of Power and Engineering who have had many years of experience in electric utility engineering and operations, integrated resource management, and international training.

X. DESIGNING AND BUILDING FOR THE FUTURE

- Fundamentals of engineering design and construction as disciplines: introductory overview, relationship to other development programs, phases of project design and construction, physical and economic commitment, and implications.

- Program planning and management strategies: engineering management and relationships; assessing available resources; identifying problems and opportunities; design techniques and construction standards, regulations, and compliance; permitting processes; integrated project planning and development; phases of project design and construction.

- Project execution and construction: project layout, construction phase completion, operation and maintenance, criteria for project evaluation, evaluation process.

- The TVA experience in engineering design and construction: the early years; major periods of engineering design and construction including hydro, fossil-fired steam generating facilities, and nuclear plants; post construction period of inspection and maintenance; overview of alternative energy research and development projects; managing to accomodate change.

Special Features

- Extensive use of TVA case studies to illustrate the design/construction process.

- Tour of several TVA hydro and fossil-fired steam power generating facilities.

Instructor/Coordinator

Earl L. Spearman, Project Civil Engineer for Hydro Design Projects in TVA's Office of Engineering, will coordinate the classroom presentation and assignment of instructors. Mr. Spearman has had extensive experience in the design of hydro structures and has authored and presented a number of technical papers on this subject. Instructors will be assigned from the areas of engineering, architecture, and construction. They have many years of experience in their respective discipline. Selected instructors will present the technical, as well as managerial, side of the engineering/construction process.

XI. REGIONAL ECONOMIC DEVELOPMENT

- Fundamentals of regional economic development: evolution and worldwide trends, attitude and role of regional development planner and institutions, problems and opportunities perceived by planners, guiding principles, tool and concepts of regional economic development planning, characteristics of a regional economy, political and social considerations, implications of regional economic development planning.

- Planning for regional economic development: aims and methods, key planning considerations, regional analysis--assessing component resources and their relationships, methods of regional economic analysis, emphasis on local and regional economies as parts of larger systems, setting regional development policies, developing strategic programs, public and private participation, relationship to other resource programs, project planning in an integrated context, state of project planning.

- Execution and management of regional economic development projects: requirements and impact assessments, procedures, accommodating change.

- The TVA experience in regional economic development: historical overview; agency philosophy; policy and goals; Federal, State, and local involvement; programs and projects; social, environmental, and economic impact on Valley region.

Special Features

- Discussions, case studies, and visual presentations will focus on understanding regional development planning and the role of regional development planners.

- Case studies will illustrate methods and practical implications of regional economic development.

- Resource program matrix for strategic program planning.

- Checklist for regional development program planning.

Instructor/Coordinator

Hubert Hinote is an economist on the Chief Economist's staff in TVA's Office of the General Manager. He has had extensive experience in the areas of economic development and evaluation and has authored numerous publications in those areas. Mr. Hinote has worked in acedemia and has also developed and implemented international training programs. He spent two years with the United Nations Industrial Development Organization in Vienna in charge of its environmental training program.

XII. COMMUNITY DEVELOPMENT

- Fundamentals of community development: communities as subsystems of a region historical overview, worldwide trends and institutional responses, characteristics and types of communities, tools and concepts of community development, approaches to community development, community development in an integrated context.

- Program planning and management practices: program planning process; community resource assessment; identifying community problems and development opportunities; goals and objective for community development; need for integration as a major goal; alternative development strategies; decisionmaking process; public and private involvement; political realities and financial constraints; managing conflicts and controversy; reaching consensus; social, environmental, and economic benefits; project planning--goals, objectives, alternatives, funding, role of various participants, etc.

- Project execution and evaluation: resource requirements, assembling and utilizing resources monitoring progress and making adjustments, evaluation criteria and strategies, interpreting and using evaluation results.

- The TVA experience in community development: history of community planning activities, agency policy goals and objectives, current approaches, selected programs and projects, emerging issues and concerns.

Special Features

- Practical strategies for local community development.

- Potential role of an integrated regional resource development agency in local community development.

- Case studies of successful community development projects will be used throughout the presentation.

- Practicum in community resource assessment using participant's counties.

- Field visits to and workshop in successful community development projects.

Instructors/Coordinators

James L. Gober, Supervisor of TVA's Developmental Planning Staff in the Division of Land and Economic Resources Development will coordinate the classroom presentations and field activities of the Developmental Planning staff for the course module on community development. Mr. Gober has extensive experience in regional planning and community development. He currently is heading the Managing Energy and Resource Efficient Cities project funded by the Agency for International Development with activities in the Philipines, Thailand, and Portugal with recent site selection visits to Indonesia. He has also headed a project team which developed a regional plan for the Itaipu Reservoir in Paraguay for the Organization of American States.

Nancy Benzinger Brown has been with TVA since 1976. A technical information specialist, as well as a regional planner, she has worked extensively in the field as planner in charge of a number of community development porjects in the TVA region, and has authored papers on subjects ranging from floodplain management to the use of microcomputers in the historic preservation field.

XIII. LAND USE AND RESOURCES MANAGEMENT

- Fundamentals of land use management: introductory overview; cultural views of land use--past, current, and future; influence of governments and institutions; worldwide trends and institutional responses.

- Planning and management practices: planning concepts and issues, public and private participation, integration concepts, management tools and techniques, data acquisitions--mapping and analysis, application of scientific and computer technology.

- Project execution and evaluation: financial and physical considerations, guidelines for project success, project implementation, evaluation criteria and techniques.

- The TVA experience in land use and resources management: historical overview, agency policy and management practices, reservoir management strategy, public participation, data base documentation--geographic information system, environmental concerns and environmental quality control, emerging issues.

Special Features

- Tours of local land use projects that demonstrate integrated management practices.
- Case exercise on developing a land use and resources management plan for participants home country.
- Both socioeconomic and natural science belief bases explored as part of decisionmaking process.

Instructor/Coordinator

Dr. Shelby Smith-Sanclare is Coordinator, Environmental Matters, for the Division of Land and Economic Resources Development, Tennessee Valley Authority. With over 20 years' experience in technical and management aspects of land use and natural resources, she most recently has emphasized environmental assessment and policy planning and development. Before coming to TVA, she worked in private industry and government, taught at the graduate and undergraduate levels, and established and managed a planning and design firm specializing in natural resources issues.

XIV. INTEGRATED REGIONAL RESOURCES MANAGEMENT PRACTICUM

- Introduction and overview of modern resource analysis tools; introductory overview; range of available tools from manual overlay techniques to sophisticated computer systems with emphasis on mini- and microcomputer-based Geographic Information Systems (GIS); concepts and issues concerning the use of a GIS as an integrated regional resource management tool; system hardware and software components including data storage, retrieval, analysis, and display capabilities; geographic referencing considerations; data structures for both mapped and descriptive attribute data; advantages and disadvantages of different approaches and tools to meet specific resource management needs.
- Hands-on integrated regional resource management practicum: participants will be given hands-on experience using TVA's Geographic Information System to test and apply resource management principles learned in the subject-matter modules; the practicum data base and exercises will relate directly to those modules; examine interrelationships among land, water, air, economic, and demographic resources and the implications of land use decisions in terms of impacts on individual resources; determine the capability of the land to support various uses; develop and evaluate alternative resource management plans.
- The TVA experience in implementing a Geographic Information System to aid integrated regional resource management: organizational structure; skills, education, and training; economic considerations; project initiation, development, and management; quality control; integrated resource data base development and use issues; interaction and relationship with natural, cultural, and economic resource specialists; adapting to changes over time; system access and use issues.

Special Features

- o TVA's Geographic Information System as a tool for integrated regional resources management will be available for hands-on use by participants.
- o Field trip to practicum study area.
- o Evening lectures by internationally recognized practitioners in the field of Geographic Information System development and use for integrated regional resource management.

Instructors/Coordinators

Charles W. Smart is Program Manager for TVA's Geographic Information Services Staff. He has 10 years of experience in developing computer-based tools for integrated regional resources management and in establishing and managing an organization to deliver services provided through use of geographic information.

E. Bruce Rowland is Projects Manager, Applications for TVA's Geographic Information Services staff. Mr. Rowland has 10-years experience in the application of geographic information systems and computer-based tools facilitate a diversity of integrated regional resource management activities. He also has experience developing and conducting practica whereby participants receive hands-on experience using modern resource analysis tools to test and apply resource management principles.

Elizabeth D. McMullen is Coordinator, Operations and Technical Services for TVA's Geographic Information Services staff. She has 7-years experience in developing computer-based tools for integrated regional resources management and in organizing and managing the technical support services required to effectively implement a geographic information system. Ms. McMullen also has experience developing and conducting practica whereby participants receive hands-on experience using such a system to test and apply resource management principles.